UDC 669.14 : 620.2 : 62-777 DEUTSCHE NORM September 1992

Designation systems for steels
Numerical system
English version of DIN EN 10 027 Part 2

DIN
EN 10 027
Part 2

Bezeichnungssysteme für Stähle; Nummernsystem

This standard supersedes parts of DIN 17 007 Part 1, April 1959x edition, and supersedes DIN 17 007 Part 2, September 1961 edition.

European Standard EN 10 027-2 : 1992 has the status of a DIN Standard.

A comma is used as the decimal marker.

National foreword

This standard has been prepared by ECISS/TC 7.

The responsible German body involved in the preparation of this standard was the *Normenausschuß Eisen und Stahl* (Steel and Iron Standards Committee), Technical Committee 19/1 *Einteilung, Benennung und Benummerung von Stählen.*

EN 10 027 Part 2 covers the structure of steel numbers and their allocation and registration. It is to be used in combination with EN 10 027 Part 1 (principal symbols) and the ECISS Information Circular IC 10 (additional symbols), and thus constitutes part of the harmonized European system of designating steels.

This standard supersedes DIN 17 007 Part 2, the specifications made for steel in DIN 17 007 Part 1, and the explanatory notes to subclause 2.2 in *DIN-Normenheft* (Standardization booklet) 3. The numerical system covered here corresponds in most respects to the system used in those DIN Standards. It should be noted that the designation system has been expanded by two digits, which will make identification more specific in the future.

The DIN Standards corresponding to the European Standards referred to in clause 2 of the EN are as follows:

European Standard	DIN Standard
EN 10 020	DIN EN 10 020
EN 10 027-1	DIN EN 10 027 Part 1
EN 10 079	DIN EN 10 079
IC 10	DIN V 17 006 Part 100

Continued overleaf.
EN comprises 9 pages.

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Standards referred to

(and not included in **Normative references**)

DIN V 17 006 Part 100	(Preliminary standard) Designation systems for steel; additional symbols for steel names (identical with IC 10)
DIN EN 10 020	Definition and classification of steel grades
DIN EN 10 027 Part 1	Designation systems for steels; steel names and principal symbols
DIN EN 10 079	Definition of steel products

Previous editions

DIN 17 007 Part 1: 04.59x; DIN 17 007 Part 2: 09.61.

Amendments

In comparison with the April 1959x edition of DIN 17 007 Part 1 and the September 1961 edition of DIN 17 007 Part 2, the following amendments have been made.

a) The appended numbers to denote the steelmaking process and the method of heat treatment have been deleted.

b) Slight changes have been made to the steel group numbers in table 1.

c) Different requirements are now specified for allocating and registering steel numbers through the Department of European Steel Registration.

International Patent Classification

C 22 C 37/00

C 22 C 38/00

Editor's note

This standard reproduces the official text of the English version of EN 10 027-2 as issued by CEN. In its preparation for publication as DIN EN 10 027-2 (English version), certain points have been noted which we consider to be in need of correction. These have been marked +). The suggested amendments are given below and will be forwarded to the responsible CEN Secretariat for its consideration.

In presentation, orthography, punctuation and hyphenation, the aim has been to implement the PNE Rules consistently. Obvious errors (e.g. redundancies and omissions) have been rectified without further reference.

Suggested amendments

1 *For ease of comprehension, subclause A.2.2 should read: '... characteristics of the material, or where such would necessitate its being assigned to one of the steel groups specified in EN 10 020...'*

2 *Since the term 'requester' is an uncommon English word, it should be replaced by 'applicant' throughout.*

3 *For the sake of clarity, the last sentence of subclause A.9 should read: 'This body has been appointed to be the European...'*

4 *For ease of comprehension, the last sentence of subclause B.1 should read: 'Before completing the forms, the applicant should familiarize himself with the specifications made in this standard, particularly with those given in annex A.'*

5 *For ease of comprehension, the phrase 'with an indication of type' should be deleted from subclause B.6 (R_e) (it has no equivalent in the German version).*

6 *To avoid confusion, the word 'intended' should be inserted before the word 'application' in subclause B.8 and in specimen forms I and II.*

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 10 027-2

July 1992

UDC 669.14 : 620.2 : 62-777

Descriptors: Iron and steel products, steels, alloy steels, unalloyed steels, heat treatable steels, designation, numerical designation.

English version

Designation systems for steels
Part 2: Numerical system

Systèmes de désignation des aciers. Partie 2: Système numérique

Bezeichnungssysteme für Stähle. Teil 2: Nummernsystem

This European Standard was approved by CEN on 1991-12-20. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization

Comité Européen de Normalisation

Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Contents

Foreword

This European Standard has been drawn up by ECISS/TC 7 'Designation of steel' whose Secretariat is held by UNSIDER (Ente Italiano di Unificazione Siderurgica).

It is the second Part of the European Standard 'Designation systems for steels', the first Part being 'Steel names'.

This European Standard was approved by CEN on 1991-12-20.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

1.1 This European Standard sets out a numbering system, referred to as steel numbers, for the designation of steel grades. It deals with the structure of steel numbers and the organization for their registration, allocation and dissemination. Such steel numbers are complementary to steel names set out in EN 10 027-1.

Application of this European Standard is obligatory for steels specified in European Standards. Application is optional for national steels and proprietary steels.

NOTE: Although the scope of the system is limited to steel, it is structured so as to be capable of being extended to include other industrially produced materials.

1.2 Steel numbers established according to this system have a fixed number of digits (see 5). They are better suited for data processing than steel names established according to EN 10 027-1.

1.3 For steels specified in European Standards the application for allocation of steel numbers (see A.6 to A.9) is the responsibility of the ECISS Technical Committee concerned. For national steel grades, the responsibility is that of the national competent body.

NOTE: Applications from European organizations having a specific interest in the standardization of steel and steel products (e.g. AECMA, EUROFER) are submitted via the ECISS Central Secretariat (see A.9).

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed as follows. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 10 020	Definition and classification of grades of steel
EN 10 027-1	Designation systems for steels. Part 1: Steel names and principal symbols
EN 10 079	Definition of steel products

3 Definitions

For the purpose of this European Standard, the definitions given in EN 10 020 and EN 10 079 shall apply.

4 Principles

4.1 Each steel number shall refer only to one steel grade. Conversely, each steel grade shall correspond to one steel number. Accordingly, a number allocated to a steel shall not, in principle (see 4.3), be used for any other steel grade (see A.1 and A.2).

4.2 Steel numbers shall be allocated by the European Registration Office in accordance with annex A.

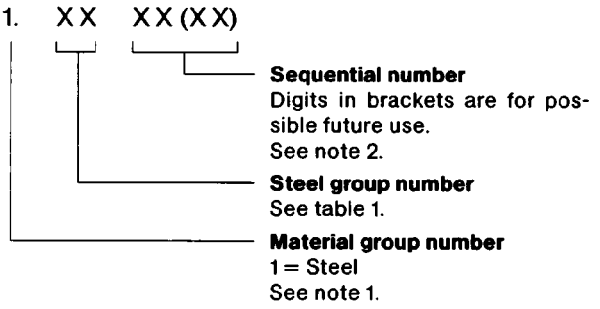
4.3 The European Registration Office (see A.9) shall revise the list of registered steels at appropriate intervals. The object of such revisions is to review, in cooperation with the bodies responsible for the application of steel numbers, those steel numbers for steels no longer in production. Such steel numbers are transferred to an annex to the list for a transitional period and eventually deleted. The revised list of registered steels is published.

Steel numbers deleted according to the above procedure may become available for re-allocation to future steel grades.

4.4 Steel numbers shall not normally be changed. If, under exceptional circumstances, a change is unavoidable, it shall be in accordance with 4.1, 4.2 and 4.3.

5 Structure of steel numbers

The structure of steel numbers is set out as follows:



NOTE 1: Numbers 2 to 9 may be allocated to other materials. See note to clause 1.

NOTE 2: At present the sequential number comprises two digits. Should an increase in the number of digits be necessary by reason of an increase in the number of steel grades to be considered, a sequential number of up to four digits is envisaged. In that case, a revision of this European Standard will be published.

Table 1: Steel groups [1], [2]

Non-alloy steels					Alloy steels								
Base steels		Quality steels		Special steels	Quality steels		Special steels						
							Tool steels	Miscellaneous steels	Stainless and heat resisting steels	Structural, pressure vessel and engineering steels			
00 / 90 Base steels				10 Steels with special physical properties			20 Cr	30	40 Stainless steel with $<$ 2,5 % Ni, without Mo, Nb and Ti	50 Mn, Si, Cu	60 Cr-Ni, with $\geq$ 2,0 $<$ 3,0 % Cr	70 Cr Cr-B	80 Cr-Si-Mo Cr-Si-Mn-Mo Cr-Si-Mo-V Cr-Si-Mn-Mo-V
		01 / 91 General structural steels, with R_m $<$ 500 N/mm^2		11 Structural, pressure vessel and engineering steels with C $<$ 0,50 %			21 Cr-Si Cr-Mn Cr-Mn-Si	31	41 Stainless steel with $<$ 2,5 % Ni and Mo, but without Nb and Ti	51 Mn-Si Mn-Cr	61	71 Cr-Si Cr-Mn Cr-Mn-B Cr-Si-Mn	81 Cr-Si-V Cr-Mn-V Cr-Si-Mn-V
		02 / 92 Other structural steels not intended for heat treatment, with R_m $<$ 500 N/mm^2		12 Structural, pressure vessel and engineering steels with C $\geq$ 0,50 %			22 Cr-V Cr-V-Si Cr-V-Mn Cr-V-Mn-Si	32 High speed steel with Co	42	52 Mn-Cu Mn-V Si-V Mn-Si-V	62 Ni-Si Ni-Mn Ni-Cu	72 Cr-Mo, with $<$ 0,35 % Mo Cr-Mo-B	82 Cr-Mo-W Cr-Mo-W-V
		03 / 93 Steels with average C $<$ 0,12 % or R_m $<$ 400 N/mm^2		13 Structural, pressure vessel and engineering steels with special requirements			23 Cr-Mo Cr-Mo-V Mo-V	33 High speed steel without Co	43 Stainless steel with $\geq$ 2,5 % Ni, but without Mo, Nb and Ti	53 Mn-Ti Si-Ti	63 Ni-Mo Ni-Mo-Mn Ni-Mo-Cu Ni-Mo-V Ni-Mn-V	73 Cr-Mo, with $\geq$ 0,35 % Mo	83
		04 / 94 Steels with average C $\geq$ 0,12 % $<$ 0,25 % or R_m $\geq$ 400 $<$ 500 N/mm^2		14			24 W Cr-W	34	44 Stainless steel with $\geq$ 2,5 % Ni and Mo, but without Nb and Ti	54 Mo Nb, Ti, V W	64	74	84 Cr-Si-Ti Cr-Mn-Ti Cr-Si-Mn-Ti

		05	95	15			25	35	45	55	65	75	85	
		Steels with average C $\geq$ 0,25 $<$ 0,55 % or $R_m \geq$ 500 $<$ 700 N/mm^2		Tool steels			W-V Cr-W-V	Bearing steels	Stainless steels with special additions	B Mn-B $<$ 1,65 % Mn	Cr-Ni-Mo, with $<$ 0,4 % Mo + $<$ 2 % Ni	Cr-V, with $<$ 2,0 % Cr	Nitriding steels	
		06	96	16			26	36	46	56	66	76	86	
		Steels with average C $\geq$ 0,55 % or $R_m \geq$ 700 N/mm^2		Tool steels			W, excluding groups 24, 25 and 27	Materials with special magnetic properties, without Co	Chemically resistant and high-temperature Ni alloys	Ni	Cr-Ni-Mo, with $<$ 0,4 % Mo + $\geq$ 2,0 $<$ 3,5 % Ni	Cr-V, with $>$ 2,0 % Cr		
		07	97	17			27	37	47	57	67	77	87	Steels not for heat treatment by user
		Steels with higher P or S content		Tool steels			With Ni	Materials with special magnetic properties, with Co	Heat resistant steels with $<$ 2,5 % Ni	Cr-Ni, with $<$ 1,0 % Cr	Cr-Ni-Mo, with $<$ 0,4 % Mo + $\geq$ 3,5 $<$ 5,0 % Ni or $\geq$ 0,4 % Mo	Cr-Mo-V		
				18	08	98	28	38	48	58	68	78	88	
				Tool steels	Steels with special physical properties		Other	Materials with special magnetic properties, without Ni	Heat resistant steels with $\geq$ 2,5 % Ni	Cr-Ni, with $\geq$ 1,0 $<$ 1,5 % Cr	Cr-Ni-V Cr-Ni-W Cr-Ni-V-W			
				19	09	99	29	39	49	59	69	79	89	High strength weldable steels
					Steels for other applications			Materials with special physical properties, with Ni	Materials with elevated temperature properties	Cr-Ni, with $\geq$ 1,5 $<$ 2,0 % Cr	Cr-Ni, except groups 57 to 68	Cr-Mn-Mo Cr-Mn-Mo-V		

Footnotes to table 1:

1) The classification of steel groups is in accordance with the classification of steels in EN 10 020.

2) The following information is provided in the boxes of the table:

a) steel group number, in upper left-hand side;
b) principal characteristics of the steel group;
c) R_m = tensile strength.

The limiting values for the chemical composition and tensile strength are for guidance only.

Annex A

(normative)

Provisions and procedures for the allocation of steel numbers

A.1 Steel numbers are allocated to steel grades in accordance with clause 4, according to specified characteristics which include:

a) chemical composition;

b) characteristics as determined by standard test methods (e.g. hardness, tensile properties, impact properties, hardenability, corrosion resistance, metallographic characteristics);

c) suitability for processing (e.g. cold forming);

d) suitability for specific applications (e.g. tyre cord wire).

Differences in delivery requirements which do not affect the material characteristics (e.g. type of marking, surface appearance, dimensions) shall not be reason to allocate a different steel number.

A.2 Specification of more restrictive or supplementary requirements for the characteristics of the material shall not normally be reason to allocate a new steel number.

A.2.1 Where a manufacturer internally restricts the specified requirements for the material characteristics for a steel in order to reduce the probability of deviating from the specified requirements, this shall not be considered reason to allocate a new number.

A.2.2 Where modifications or additional requirements cause a significant alteration in the characteristics of the material, or even to changing the classification of the grade to EN 10 020 +) (e.g. reduction in maximum sulfur content from 0,035 % to 0,010 %), this shall be considered reason to allocate a new steel number.

NOTE: For practical reasons, an existing steel number may be supplemented by an appropriate symbol or text in order to denote certain specific requirements. Such additions do not form part of the steel number.

A.3 Steel numbers shall only be allocated to steel grades that have a commercial standing.

A.4 The justification of a new steel number shall always be verified by reference to the latest listing of allocated numbers in order to determine the availability of a usable number (see A.12).

A.5 In accordance with subclauses 4.1 and 4.3, for a new steel number to be allocated, the characteristics (see A.1) shall be significantly different from any other steel grade for which a steel number has already been allocated.

A.6 A request for the allocation of a steel number shall be submitted on the relevant steel number assignment form. See annex B.

A.7 The guidance provided in annex B should be carefully read, and the information provided as indicated.

NOTE: The forms are designed to serve as a data input sheet to facilitate the processing of each request through to final print out of data by electronic data processing equipment and to minimize transcription errors.

A.8 To further assist in the allocation of a steel number, the requester +) is asked to suggest a possible steel group number. See table 1.

A.9 Each completed application form shall be sent to:

Verein Deutscher Eisenhüttenleute
Abteilung Europäische Stahlregistratur
Sohnstraße 65
D-4000 Düsseldorf 1
Germany

Which will act as the appointed European Registration Office for the allocation and administration of steel numbers. +)

NOTE: For applications from other European organizations (see note to 1.3), a copy of the application may be sent directly to the European Registration Office.

A.10 The European Registration Office is responsible to ECISS, to which it shall report annually.

A.11 The European Registration Office shall inform applicants of the action taken, within 3 months. Disputes concerning the allocation of a steel number may be referred to the Coordinating Commission (COCOR) of ECISS by or via the responsible body (see 1.3).

A.12 The European Registration Office shall prepare and publish at appropriate intervals a list of all the registered steels and their steel numbers.

Annex B
(normative)

Guidance for completing forms I and II

B.1 Application forms

Application forms for the allocation of steel numbers are as follows, and details are attached to this annex.

a) Form I For the allocation of steel numbers where chemical composition is the primary specifying criterion.

b) Form II For the allocation of steel numbers where mechanical properties are the primary specifying criteria.

Before completing the forms, the requester should be thoroughly familiar with EN 10027-2 and in particular annex A. +)

B.2 Steel group number suggested by the requester

The steel group number suggested by the requester shall be in accordance with EN 10 027-2. While the requester's suggestion may or may not be the number finally allocated, it will assist the registration office.

B.3 Steel name

The steel name for the steel grade shall be in accordance with EN 10 027-1.

B.4 Product

Indicate:

a) product form, using the terms in EN 10 079 or suitable abbreviations, e.g.:

- FL = flat products
- B = bars or sections
- W = wire
- FO = forgings
- C = castings
- TS = seamless tube
- TW = welded tube

b) thickness, in mm, preferably using ranges (e.g. $\leq$ 16 mm, $>$ 16 $\leq$ 40, $>$ 40 $\leq$ 100, $>$ 100);

c) treatment condition, using the symbols in accordance with EN 10 027-1, for which the specified properties apply. See B.6.

EXAMPLE:
FL/ < 16/N indicates a flat product equal to or less than 16 mm thick, in the normalized condition.

B.5 Chemical composition

Express chemical composition limits as, for example, 0.13–0.18 (not .13–.18 or 0.13 to 0.18), $\leq$ 1.50, $\geq$ 0.040.

B.6 Mechanical properties

The symbols used are as follows:

R_e = specified yield strength (R_{eH} or $R_{p\,0,2}$), in N/mm^2, with an indication of the type +) (e.g. $R_{eH} \geq 240$)

R_m = specified tensile strength, in N/mm^2 (e.g. 400–650, $\leq$ 700)

A or A_{80} = minimum specified percentage elongation after fracture (see form II)

KV_{min} = minimum impact energy in Joules (J) using a Charpy V-notch test piece:

L = longitudinal test piece

T = transverse test piece

RT = room temperature

TT_{KV} = maximum transition temperature, in °C, of the impact energy/testing temperature curve, with $KV = 27$ J as transition criterion

B.7 Specified in

The standard or specification in which the steel grade is specified shall be indicated.

B.8 Application

Indicate application +) (e.g. structural steel, engineering steel, steel for case hardening, for welding electrodes, for turbines, tool steels, for manufacturing wire ropes, etc.).

B.9 Characteristics

Indicate characteristics (e.g. suitable for cold hardening or cold extrusion, non-magnetic, etc.).

B.10 Additional information

Where the space elsewhere in the form is not sufficient for an exact description of the steel concerned, use the space headed 'Additional information'.

B.11 Warning note

Organizations and individuals who deal with the allocation and administration of steel numbers take no position with regard to the validity of any patent rights claimed in connection with any steel under consideration. Users of steel numbers are expressly advised that the determination of the validity of any such patent rights and the risk of infringement is entirely their own responsibility.

Form I. The allocation of steel numbers where chemical composition is the primary specifying criterion

Requester	Name Organization Address Telephone, telex, telefax

Information regarding	Steel number	Steel name	Product [1]			C %	Si %	Mn %	P %	S %
			Form	Thickness, in mm	Condition					
Requester (R)	1.									
Assigner (A)	1.									

Cr %	Mo %	Ni %			Specified in	Application	Characteristics	Date

Additional information (of R or A):

[1]) For product names, use the terms and definitions in EN 10 079.

Form II. The allocation of steel numbers where mechanical properties are the primary specifying criteria

Requester Name
Organization
Address

Telephone, telex, telefax

Information regarding	Steel number	Steel name	Product [1]			R_e N/mm²	R_m N/mm²	[2] A_{min} $A_{80\ min}$	$KV_{min,\ RT}$		$TT_{KV,\ max}$	
			Form	Thickness, in mm	Condition				L J	T J	L °C	T °C
Requester (R)	1.											
Assigner (A)	1.											

C %	Si %	Mn %	P %	S %	Specified in	Application	Characteristics	Date

Additional information (of R or A):

[1] For product names, use the terms and definitions in EN 10 079.
[2] Delete inappropriate symbol.